

HUB Headlight

HUB Division Inc., Northeastern Region, National Model Railroad Association - www.hubdiv.org
Volume 40, Number 4, March - April, 2024

RAILFUN TIMETABLE

Scratch-Building Turnouts in Place

By Peter Watson, MMR

10 AM Saturday, March 16, 2024

St. Ann's Parish Hall, West Bridgewater, MA

In recent years, scratch-building switches has been made easier by using the Fast Tracks jigs. But what do you do when you need a switch that isn't a standard size? Maybe it is on a curve or right on top of another track element? Or maybe you are building in narrow gauge? This clinic will show you how to scratch-build a turnout in place without using a jig. Pete will build a switch from start to finish during this clinic.

After the meeting, you can visit Dave MacPherson's nearby HO-scale layout.

Dave MacPherson's Clinch Mountain Railway

This basement layout is located in two rooms. The first has a folded dogbone track plan with grades, three passing sidings, industrial sidings, an industrial area, engine terminal, and a freight / passenger yard. This section is suitable for both continuous and point-to-point operation. A tunnel brings the mainline into the second room that is an around-the-wall configuration with many industries, three freight / interchange yards, and a large industrial area.



The layout was featured as the cover article in the September 2014 *Model Railroader*.

Modeling Rocks and Water

By Chris Lyon, Eastern Canada Division

8 PM Friday, April 19, 2024, Zoom Meeting

Chris Lyon has been a model railroader for more than 50 years. He has a rich history as a club member and has participated in many associations serving as their executives and has been active at conferences as an organizer and clinician. He has built several layouts and spent tons of volunteer time helping others with their projects. His YouTube channel CNLVN has over 300 videos that focus on all aspects of the hobby including layout visits, interviews and sharing ideas and techniques. In recent years he has focused on dioramas and this has moved his interest toward creating realistic scenes. This clinic specifically looks at modeling rocks and water and includes ideas about materials, processes and techniques you may wish to have in your tool box. Join us and have some fun.

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(Refer to Page 14 for information about RAILFUN updates and cancellations)

Introduction to Filament-Based 3D Printing: Part I

By Robert Manna

Dave Insley presented on 3D printing at the January 20th RAILFUN meeting in Chelmsford MA. Dave covered a lot of great basic introductory information, but time was limited and not everyone could make it out to RAILFUN. Therefore, I thought I'd take the opportunity to build on what Dave shared.

I'll try not to repeat the information that Dave presented. His slide deck and other materials are posted on the HUB website under the RAILFUN section. This article will focus primarily on plastic filament printers for a few reasons. They are generally the most popular and affordable to acquire, relatively easy and forgiving to start using, and it's the type of printer with which I have had the most recent experience.

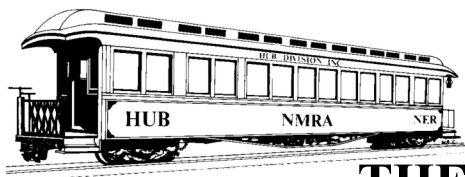
Hardware

Filament printers apply a more fundamental technology known as Fused Deposition Model (FDM) where the printing material (a filament / strand) is fed into a print head

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THE PRESIDENT'S CAR

By Manny Escobar

Winter is half-way through and we had outstanding events over the past months. Thank you all for volunteering at these events. We still have more to come: modular displays, RAILFUN sessions and elections at our annual meeting.

This year we are going to have a few challenges on our agenda. I read Gordy Robins's column in the February 2023 *NMRA Magazine* about the frustration of growing membership and retaining present members throughout the organization. The article mentions "Drops in membership don't happen because the hobby is dying – it's far from doing that – but more often because we are too humble to help people find us." I tell the public that HUB Division, NER and the NMRA provide "awareness" and "education" for the model railroad hobby. They

are a way to learn about all aspects of Model Railroading.

The HUB Division is a volunteer organization, by that I mean the whole organization is run by volunteers. We need you, in some capacity to make the organization operate. The HUB still has some positions to be filled, so reach out to me or any of our department directors if you want to volunteer or learn more about them. I have various open department manager positions and additional openings occurring in the coming years. So far, no members have shown interest or approached me to discuss volunteering for any position. If you have a conversation with any members, please ask them if they are willing to help or volunteer, and please ask them to contact me. Positions will be appointed by June by the president at the the June Board of Directors meeting.

We started having in-person RAILFUN sessions on Saturday morning or early afternoon at different locations and venues every other month, with online Friday night RAILFUN session in between. Peter Watson, MMR has done a great job on organizing the sessions per this new setup, which we will hope helps membership attendance.

Continuing with the challenges to the HUB, the other crucial item is finding a venue or facility that we can use to store our trailers, supplies, and/or for our meetings and a workshop. Our current storage / workshop setup needs to be changed by no later than 2025. It is a major challenge, since even finding a venue location for RAILFUN meetings is difficult. If you have any suggestions or know a contact who is willing to help out, please reach out to me; president@hubiv.org or call me.

Remember to please vote online per the announcement that you will receive from Election Buddy in March. Then join us on Friday, April 19, 2024 for our HUB Division Annual Meeting via Zoom at 8:00 PM for the election results and annual reports.

Stay safe and healthy, and I hope to hear or see you in the coming months.

"Keep 'Em Rolling"

New Members

The HUB Division welcomes the following new members

- Matthew Castle, Chelmsford, MA
- Christopher Tonkin, Arlington, MA

Wenham Museum Display



The HUB modular layout on display at the Wenham Museum (top left) January 13 to 15. Peter Higgins had a membership table set up (bottom left) while the layout was on display (right).

Left to right: Dick Ball, Curtis Rand and Rod Feak.

Photos by Bruce Robinson



Shanty Talk:

By Rudy Slovacek

Winter

It is my understanding that most of the model railroading crew went off to Springfield for that annual convention, leaving behind a skeleton crew. “Slim” suggested that we take the opportunity to make sure the plow was in top operating condition should it be needed for a winter snowstorm. Basically, this means lubricating parts that need to move and fixing those parts which shouldn’t. Figure 1 shows our trip south down the line and Figure 2 the trip back northbound to make sure there were no obstructions that might cause fouling of the plow. The idea was to address any issues before a storm. At

this time, “Pete” and “Slim”, also took the opportunity to make sure all the wood and coal boxes were filled for the winter. As I’m sure I’ve stated before, and for you newcomers to my column, shanties were born out of the need to keep warm during the bitter cold winters here in New England. A shanty had four walls and a roof to keep out the elements and while construction varied greatly you might be lucky enough to have a small pot belly stove to keep the place warm. My first encounter was the switch location just on the north side of Blue Barns Road, where the old Fitchburg line of the B&M split into a passing siding before it curved around and crossed Ashdown Road on the way to merge with the D&H at Crescent in Clifton Park. It was painted a reddish-brown but removed some years later. I observed this as a kid every time my dad drove up to Burnt Hills Hardware. My other notable encounter was with the currently restored shanty in downtown

Saratoga Springs, (as seen in my column header). Shanties were usually constructed at roadway crossings in heavily used areas to protect the guards on duty to flag traffic for an oncoming train. This was, of course, before the extensive use of automatic signals and crossing gates. Alternatively, they were used for switch tenders and the poor brakemen who pulled duty on a cold night in January at the end of a yard. If you were lucky, the preceding shift left the stove stoked and a pot of warm coffee on. It was a welcome relief and a place to meet and exchange a bit of news while warming those frost-bitten hands.

Speaking of news, elections for new board members are coming up. Unfortunately the list of candidates is small so we’ll probably end up just electing those members whose terms have expired, unless there is a write-in campaign. Where’s the spirit guys and girls?



Figure 1: Off goes the plow south down the line



Figure 2: The trip back northbound.



HUB High Green

An Operations-Themed Weekend
May 4-5, 2024

HUB High Green is on track to provide a weekend of operating sessions on host layouts located in Massachusetts and New Hampshire. More than six layouts in N, HO, and O scales and Fn3 will be available for operators to run trains on. Sessions will run on Saturday morning, afternoon and evening and Sunday morning and afternoon.

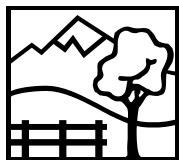
More information will be coming soon.

Save the date!



John McHugh from Seacoast Division (left) and Gerry Covino from HUB Division (right) have a meet at the Franklin Depot on the Valley Junction RR. Trains on the VJRR run on a schedule governed by a 6:1 fast clock.

Achievement Program



Master Builder Scenery

By Peter Watson,
HUB Div. AP Chairman

We haven't done an Achievement Program article for a while so I thought now would be a good time to take a look at another one of the categories. The AP program has 11 categories covering all facets of model railroading in four broad groups, Equipment, Settings, Engineering and Operations, and Service to the Hobby. This month, we will take a look at one of the Certificates under Settings – Master Builder Scenery.

We all enjoy seeing our trains running through a scenic setting. Building scenery is easy and fun, and you don't have to be an artist to make good-looking scenery. The AP program doesn't care how you create your scenery, it is mainly concerned with "the prototypical rendering of scenic effects from the ground up". How you get there is up to you. So let's take a look at the requirements to qualify for Master Builder Scenery.

To see a complete list of the AP requirements go to the NMRA website. At the top there is a tab for the Achievement Program. Clicking on this tab will take you to the main AP page where you will find some general information about the program and on the right side there is a list of various links. Click on the link for Categories and choose Scenery.

The amount of scenery you need to have to qualify depends on which scale you model in. For HO you need to have 32 sq. ft., for N-scale you need 18 sq. ft. You can use several independent scenes in different scales to meet this requirement as long as each one is a minimum of 8 sq. ft. (2' x 4'). One member qualified using several dioramas. The intent here is "the prototypical rendering of the scenic elements from the ground up".

Other requirements are that "this completed section must contain the necessary scenic elements of Terrain, Structures, Background, Lighting, and Realism /



An example of the scenery on the Stone Canyon RR by John Feraca, MMR

Conformity as combined to achieve a realistic effect" and they must earn 87 1/2 points using the AP scenery judging sheet. The definitions of these elements are found on the AP scenery page.

Terrain (35 points): Includes all of the ground features such as hills, ditches, cuts and fills, flat areas, streets and roads and water features. It also includes vegetation like trees, shrubs, grass and weeds.

Structures (20 Points): Includes buildings, bridges and trestles, culverts, retaining walls, crossing gates and shanties, turntables, etc. They are evaluated on how well they fit into the scene. Are they appropriate for the scene? Are they set into the scene not just placed on top? Are they weathered at least enough to make them look real?

Background (25 points): This is "treatment of the wall, backdrop, and/or ceiling to realistically depict depth, distance, horizon, and sky". This does not mean that you need a photographically rendered backdrop or one painted by an artist. What it does mean is the backdrop should give the illusion that the scene extends beyond the confines of the model.

Lighting (20 points): This covers lighting/illumination effects from three aspects:

1. Railroad cars, signals, etc.

2. Buildings, streets, and roads, etc.
3. Overall lighting effects - day and/or night.

Note that the requirements allow for a totally day-lit scene. However, even in a day-lit scene there will be evidence of lighting, such as street lights, lights over doorways, signals, etc. These do not have to be operational but you will get more points if they are.

Realism / Conformity (25 points): In this area, you will be judged more on how well you accomplished what you were trying to do. Does it look right?

Finally, there is the paperwork. The AP Scenery page lists the paperwork required to document what you have done. It includes photos and a written description. This does not need to be complex, simple statements are fine. You also need to submit a Statement of Qualifications (SOQ) that can be downloaded from the website, a copy of the materials used, and a copy of the Merit Award.

This article is intended to give a brief overview of the requirements. For specific details go to the website to see the complete set of requirements and in depth discussion. If you want more help or have any questions feel free to contact me at hub.ap.chair@hubdiv.org.

Candidates for The HUB Division Board of Directors

Erich Whitney

First, I would like to thank you for the opportunity to serve on your behalf as a member of the HUB Board of Directors. I have made significant progress over these past three years on the goals I stated in my letter to you in January 2021. While some of that progress isn't as visible as I would like, the work continues to move forward, and I feel good about the future of our modular group and our division.

- Lenz equipment HUB and member upgrade program (with Stan Ames)
- New LCC panels for Upton and Hoosac yards (with Jeff Gerow and Gerry Covino)
- Debut of the prototype HUB Signaling Testbed (which informed the new panel design)
- Continued HUB *Headlight* column
- HUB Online Meeting Coordinator

My message is simple, if you want something done, give it to a busy person. I think we are all busy but if we want change, we find the time to make it happen.

I am still very much of the mindset of making things happen. We have some challenges ahead of us, but I think together we will be successful. I hope I have earned your vote in the upcoming HUB BOD election.

Manuel P. Escobar

Since returning in 2021, I have completed my first term as one of your Directors and three-years as your President. I would like to say that it has been a pleasure and honor serving you and our organization. Our traditions, legacy of the HUB Division and especially our members have been amazing during my tenure because of their support and ideas

Even after 12 years of participation with the Board, I am in awe of the body of knowledge I have learned by becoming involved with our members and participating in activities in this marvelous hobby. The HUB's activity in the past three years has been tremendous, since coming out of Covid. I have been involved in various projects and the other activities that our membership has brought to the Board. Our finances are on the positive side of the ledger and growing slowly but steadily. I believe in promoting more activities aimed at making the public aware and educating them, since they are the future of our hobby.

I am asking for your vote so I may continue as a member of the Board of Directors. Thank you in advance for your consideration.

Peter Higgins

Once again it's decision time and I'm reaching out to you for your support to return me to the HUB Division's Board of Directors. Many of us met for the first time at the Membership Table where I've served as the HUB's Membership Chairman since 2011. Some of you have even joined me in our venture to promote the hobby and create an awareness of the HUB Division and the NMRA and its benefits to model railroaders. In this role, I've taken the Membership display on the road to numerous Model RR Shows, the Worcester MRRC, the Old Colony MRRC, Holliston Live Steamers, the Greenberg Shows, Amherst and our own NEMTE Show. I've been a regular part of the Museum of Science crew just about every Thursday. Since 2014 I've supported our Northeast Region by organizing the convention raffles. Hopefully some of you reading this will be encouraged to head to the NER Convention in Rochester NY next September.

However, my main reason for seeking your support to return me to the BOD is so that I can represent each of you and be your voice at the BOD Table. I'm always available to hear your concerns and will represent you to the best of my ability.

Voting Procedures for Board of Directors Election

The HUB Division will again use the Election Buddy electronic voting system. The Division implemented this system starting in 2021 to make voting easier for our members. We will continue to use this system going forward.

The HUB Division will be conducting an online Annual Meeting this year on Friday, April 19th, immediately preceding the online Zoom RAILFUN session. During the meeting, the Clerk will announce the results of the election.

All members who have provided the HUB Division or the NMRA with an email address will receive an email directly from Election Buddy with your unique voting code and instructions for submitting your ballot. Emails from Election Buddy will arrive around March 1, 2024. If you do not receive an email, or if you do not have an email address, please contact the HUB Division Clerk by telephone, (508) 378-3582, and ask for Peter Watson. Peter will take your information and will mail you a ballot with instructions for returning it to him. In order for Peter to count your ballot, he must receive it by April 15, 2024.

Like the NMRA, the HUB Division plans to continue using this online method to conduct elections. The HUB Division also routinely sends information to members using the hubdiv@googlegroups.com email list and the online Constant Contact system. With email notifications being the primary method of communication, it is important to keep this information up-to-date at the local and national levels.

Intro to 3D Printing: Part I

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(**nozzle**) which deposits the material onto a **print bed** to 'build' a model. In the case of plastic-based filaments, the print head uses heat to melt the plastic filament to deposit it in the appropriate shape.

Precision: If you're looking to print rivet details on an HO-scale car body, filament printing is not what you are looking for. Filament printers typically start with a nozzle diameter size of 0.4 mm (though you can go down as far as 0.1 mm). The bed accuracy (thickness of each layer) can also go down to 0.1 mm. While that is quite tiny, it means that your level of detail (**minimum feature size**) that can be accurately printed lives around 1.8 mm (~4 x nozzle width) and larger; which is about 0.07" and falls somewhere between 1/16" and 3/32". The specifications above are 'best in class' so not every device can achieve that level of precision.

Size: There are some filament printers available that can handle very large models, although most of the hardware that a consumer/hobbyist is likely to consider maxes out at about 256 mm (10") in all three axes. There are printers that have smaller maximum print dimensions. When you start to think about what you want to print, considering the size becomes important. 'Bigger' objects can be printed, but you may need to get cre-

ative in terms of positioning of the object, or breaking a large object down into smaller pieces that can be assembled.

Printer Mechanics

There are multiple manufacturers of filament printers with price points that range from a couple hundred dollars to two thousand or more. As with most things, to a degree you pay for what you get. Dave's philosophy was to start with a relatively small investment given his knowledge base, whereas our choice was to go 'all in,' the logic for which will be discussed further down. First, though, a discussion on printer geometry and 'physics.'

Typically, the lower cost filament printers are of a type nicknamed 'bed slingers' (Figure 1) this is because the bed that the object is printed on moves backwards and forwards, providing the 'Y' axis for laying down filament. The 'X' axis is achieved by the print head itself moving side to side on its gantry. The 'Z' axis is generally achieved by the print head moving vertically relative to the bed. This printer style was made particularly popular by the manufacturer 'Prusa' with several other companies 'cloning' Prusa's design for their own. A major advantage of bed slingers is their relative simplicity in terms of their mechanics. Many manufacturers ship bed slingers as 'kits' that the buyer must assemble (fully assembled versions

are also available). The simplicity and ease of assembly also means that bed slingers are frequently lower in cost, and they can often be customized by the end user relatively easily.

The other major style of printer is referred to as CoreXY (Figure 2). CoreXY machines feature a print head where the gantry moves in both the X and Y axis, allowing for a high degree of control and accuracy. To achieve the vertical Z axis typically the bed itself moves (though there are designs where the print head can move in all three axes). In the case of a moving bed, it goes 'down' as the printed object is 'built up', as opposed to bed slingers where the head moves 'up' as the printed object is 'built-up'. In CoreXY printers the bed is supported on threaded rods that are spun by their own motors, this can allow the printer to self-level the bed itself. Depending on the number of rods, two, three or four, differing levels of precision can be achieved.

There are several manufacturers who are the 'leaders,' with a number of other companies making units. Your best bet is to do your research (online) to help with making your own choice. The market leaders (at the time of writing) can considered to be:

- Prusa Research
- Creality
- Bambu Lab
- Elegoo

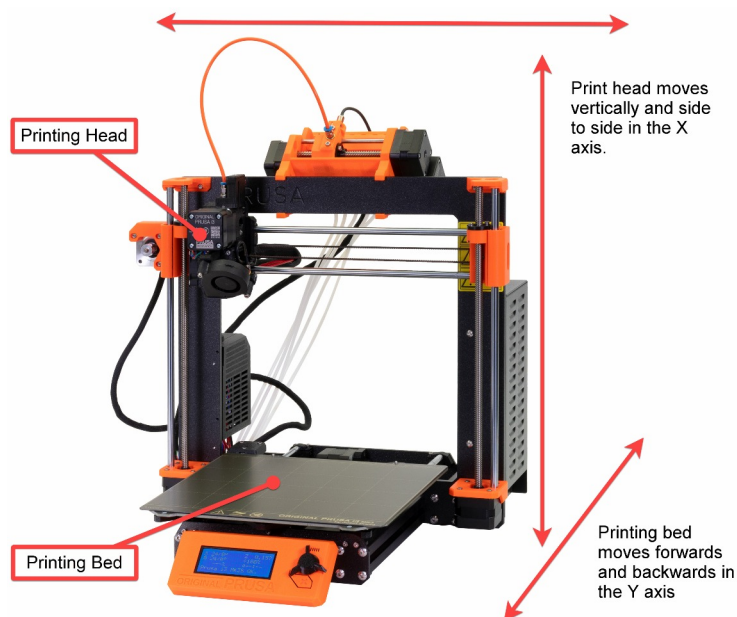


Figure 1: Prusa i3 'bed slinger' Credit: Prusa Research

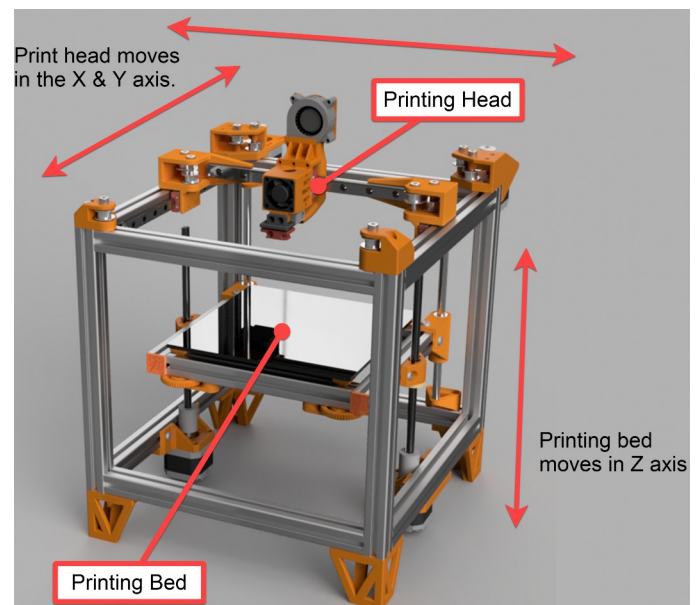


Figure 2 generic CoreXY printer. Credit: Tim Wieder under license CC BY-SA-NC

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Intro to 3D Printing: Part I

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Besides variations in economy and performance, a critical difference between these two styles of printers is the amount of space each requires and the nature of the space. The bed slingers by virtue of their design require ‘free space’ on either side of the bed so that it can traverse as required. As the bed size increases, the required amount of space increases. Conversely, for CoreXY printers, the required footprint is fixed as the bed (if it moves) only moves vertically.

This key difference has another major impact, the ease of which the printer can be ‘enclosed’. CoreXY printers readily lend themselves to be enclosed as they require a solid frame to support the print head gantry and allow the bed to move. The frame provides natural connection points for panels to enclose the print volume. Enclosures can be important to assist with thermal control; when the printer is enclosed, it is easier for the printer to control its thermal profile when running. As the printer is literally melting the material being printed, appropriate thermal control is an important factor in the quality of the outcome of a given print job.

There are three areas where thermal control is important for FDM printing:

- The print head, where the material is melted for deposition. Different material types require different heating points, consistent heating also ensures consistent material flow which has a direct impact on the quality of the printed model.
- The print bed frequently has a heating element. Heating the bed is important to ensure the printed model does not warp or deform during the overall print process as the material cools.
- The overall print volume, in the case of an enclosed printer, this is not typically heated but there will often be cooling fans to help maintain a consistent temperature. The point being that the ambient air temperature can have an impact on printing; too warm and the material will stay soft for too long, too cold and the material cools off too quickly, either condition can result in ‘bad’ prints.



Figure 3: My personal printer with insulation and an AMS.

Enclosing bed slingers, while not impossible, is more challenging than enclosing CoreXY printers. Enclosures are not required, but depending on where you intend to set-up your printer and the plastic types you plan to print, an enclosure could make a difference in performance. In our case the printer is in our garage, which, while insulated, is not conditioned space. A side benefit of an enclosed printer is that it’s easy to add ‘insulation’ in the form of 2” thick extruded foam panels, to help keep the printer warm in a colder space (Figure 3).

Enclosures are also beneficial as they can help to keep the printer and its mechanisms cleaner as there is less opportunity for dust to get on or into the inside of the printer. If you plan to set-up your printer in your ‘workshop’ where you may also be cutting, sanding, etc. then an enclosure will help to keep all that dust out of the printer. People with bed slingers do get

Learning Points:

- Filament printers come in two different styles with a wide cost range.
- Consider ‘feature resolution’ in terms of projects you have in mind.
- Consider ‘ease of use’ when researching printers. Are you looking for a hobby within a hobby?
- Thermal levels and minimizing dust are considerations when thinking about where to locate a printer.



Figure 4: A friend’s bed slinger with its own ‘tent’. Credit: courtesy of M. Reardon

creative (Figure 4) with how to enclose them including building (or printing the parts to assemble) enclosures large enough to accommodate the movement of the bed.

One last note – speed: 3D printing on consumer/prosumer devices is generally not a ‘quick’ endeavor. Small, simple prints will be relatively quick, anything of significant size and volume is going to take a while, on the order of hours. CoreXY printers will generally be faster than bed slingers by virtue of the mechanics and design, moving the head in the XY will be faster than moving the head in X and the bed in the Y direction.

Automatic Material Systems (AMS)

The last piece of the hardware discussion is what are commonly referred to as Automatic Material Systems. These are frequently ‘add-ons’ to printers. Their main role is to allow you to have pre-loaded more than one spool of filament material. For instance, a primary color for your print and a support material roll (support materials will be discussed later). The AMS, in conjunction with the print job that has been sent to the printer, will automatically switch between the required filaments as the job is printed. This even means you can combine multiple colors into a single print. For example you could, in theory, print a whole building model, where the foundation is grey, the brick is red, and the roof is brown. There are several reasons why I personally wouldn’t

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Intro to 3D Printing: Part I

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recommend that approach, but the fact is, you can do it. You can print from multiple spools of material without an AMS, doing so would require you to manually unload and load each filament as the print progresses. AMS devices make it easier, faster, and 'more' automatic. As with anything, do your own research to decide what is right for you. Think of it as the difference between getting an SUV with an automatic lift-gate or without...

Decision Time

Before moving on to discussions around consumables, maintenance and the software and processes all involved in actual printing (to be covered in future issues of the *Headlight*) let's stop to discuss my own personal decision as to what printer to buy particularly in contrast to Dave's approach.

My professional background is in architecture, engineering and technology, so I have been in and around 3D printing and various other CNC (Computer Numerical Control) tools since some of the first 'mass market' products became available in the early 2000's. This also means I have a strong background in 3D Modeling (CAD) of various flavors. The point is, I have experience and exposure to the technology, where in contrast it was not something that Dave was particularly familiar with when he decided to wiggle his toes in the water. What was of most interest to me, though, was not having 3D printing become its own hobby within a hobby (I already have plenty of those) by too many degrees.

To that end I was looking for the 'Ready to Run' version of 3D printing. The equivalent of the model kit that requires only the application of a few detail items, not a craftsman wood kit that requires you to start by cutting all the pieces of lumber you need before you can even start building the actual kit! Therefore, I decided to purchase a Bambu printer and, because I wanted it to be as easy as possible including swapping materials, I decided to go with Bambu's highest-end Carbon X-1 that includes the AMS. This is a significant investment, but I'm confident that in

the long term it will be worth it. The Carbon X-1 also includes additional features that help to make printing more of a 'point & click' experience, including things like auto bed leveling, error detection and even a built-in camera so that you can easily 'check-in' on print operations. So far it has lived up to expectations. I was able to print a few pre-loaded models 'instantly' using the included default settings with no issues whatsoever; it just printed. This was the experience I was looking for. Not to say that there are not things I've already learned as I have taken on larger, more complex prints, but it has generally been 'easy.'

Conclusion

The important things to think about as you consider buying your own printer, and what printer to buy are:

- What kind of experience do you already have?
- How familiar are you with technology and computers in general?
- What is it you want to accomplish? We'll dig into processes in future articles, but ask yourself, what do you want to achieve, what's your time frame and, if your end goal is 'complex,' what smaller projects or less complex projects will you take on to get you there?

Like any other tool, learning how to use it properly is important, like any piece of technology, rarely is it as simple as point and click. Bambu gets close to the 'point and click' experience, other vendors are somewhere on the spectrum from the craftsman kit to put the locomotive on the track, program the DCC address and run a train. Consideration of how and where you plan to put your tool, and other functional requirements all play a roll in your decision.



Figure 5: dinosaur puzzle printed on the Carbon X1 out of the box



Figure 6: 'Benchy' model for benchmarking 3D printer performance, printed out of the box

Additional Thoughts

3D printing is 'cool' and it is 'fun,' particularly if you start to design and print your own projects, or even take advantage of the wide variety of models that are free or available for purchase to print. Take the time to do your research, particularly if you're new to the technology. There are many, many YouTube videos, more articles than a person could ever read, websites dedicated to 3D printing and forums and chat groups. If this is something that you decide to make part of your model railroading tool belt, you should not be surprised by the experience. Be mentally prepared in terms of what to expect based on your research and what you choose to purchase.

Part II will delve into the consumables and associated maintenance that goes with a 3D printer. Here's a hint: like any complex tool, it's more than material (filament). Part III will get into processes for printing, the software used and my own philosophy on why I decided to make the leap and purchase a printer.

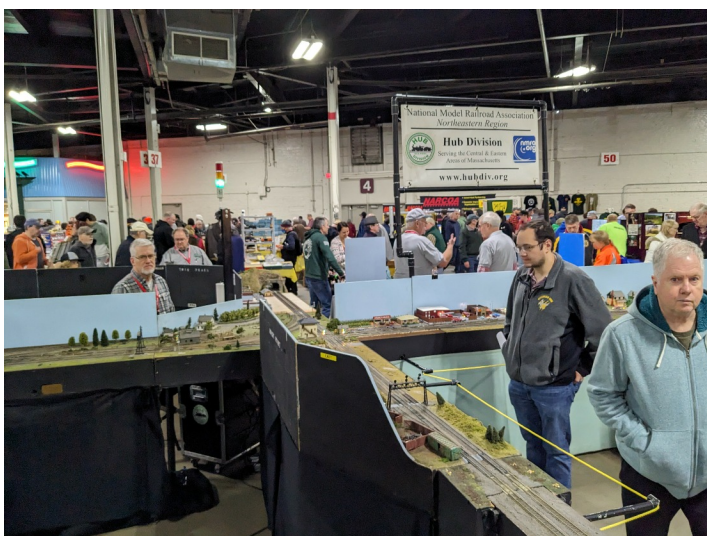
If you'd like to see this material presented as a RAILFUN session or a clinic, or if you have questions please feel free to reach out to me:

robert.manna@gmail.com.



**Support
Your
Division!**

Springfield Show



Top Left: The Ohio crew watches over Larry Madson's steel mill modules.
 Middle Left: The area of the junction with it's signal system along with the HUB sign and Membership Table beyond.
 Bottom Left: The editor's son Colin operates Bob Collins' train on the branch line.
 Photos by Bill Barry

Top Right: Bob Collins goes over the module group operating rules and procedures during the pre-show meeting on Saturday morning.
 Middle Right: Sunday morning.
 Photos by Jeff Gerow
 Bottom Right: The branch line stretches out into the distance.
 Photo by Bill Barry

Erich's Electronics Notebook

By Erich Whitney

LCC Module Yard Panels (Part 2)

Less than a week before the Amherst show in Springfield, Jeff Gerow and I completed the final debugging and testing of Upton yard and its new panel. We managed to get through the show with some “growing pains” but more things worked than didn’t. Unfortunately, since Upton yard had not been used for an entire year, the relays that switch DCC power to the correct boosters coming into the yard decided they were done so now they need to be replaced. That project is now on the list. In an ideal world, we would have been able to get all this debugging done completely offline, but that would have meant another year with no yards. We decided to debug “live” and use what we could get working as we went along. The nice thing about LCC is that once you have built the network, you can login with a laptop and make changes in real time. I suspect this was particularly stressful for Jeff since he was the one doing the LCC logic. It’s difficult to think clearly when you’re in the middle of a show trying to concentrate while everyone around you is telling you the yard isn’t working. I’m sure from the “outside looking in,” it might not seem this way, but we are actually very close to completion, and we have our “punch list” of things to fix so we will converge soon.

Panel Design

When we started this project, one of the principal goals was to recreate the same basic functionality of the previous yard panels so that learning how to use the new panels wouldn’t be a big issue for our members. At the same time, we wanted to modernize the implementation so that future repairs or even upgrades and improvements could be done by anyone familiar with the standards-based solutions we incorporated into the design. We also wanted a design from which members could learn. Add to that our desire to

migrate our signaling system to LCC and that choice became simple. LCC is based on a very straightforward producer / consumer paradigm. Simply put, everything that happens on the LCC network is an event going from one or more “producers” to one or more “consumers”. In the context of building a yard panel, the push buttons are the “producers” while the turnouts and LEDs are the “consumers”. The push buttons produce an event that tells the LCC system something has happened, and the logic is configured such that when that event happens, the correct consumers know what to do about it, for example, illuminate an LED, throw a turnout, or some combination of those actions. I don’t want to trivialize the effort it took Jeff to turn that straightforward concept into a functioning panel. I think a future in-depth clinic on LCC programming is probably a good place to cover this topic for anyone interested in diving into the details. Writing about LCC programming in this column would approach the complexity of writing a textbook and I’m not really at a point in my life where I can take that on.

This physical panel design is based around the use of Berrett Hill Touch-Trigger switches. These are not to be confused with the Berrett Hill Touch-Toggle switches. There IS a difference, and it is a very important one. Kevin Hunter (Berrett Hill) and Dick Bronson (RR-CirKits) collaborated on the development of the Touch-Trigger so that it would plug directly into the RR-CirKits LCC digital I/O ports and function as a single-wire push button switch and LED. So with one wire I can have a push button switch and LED that are software controllable and I don’t have to buy a separate interface board (which the Touch-Toggle requires). The decision to use these touch-type switches was made to eliminate the problems we have had with physical push button switches getting broken. My thought was, if there are no moving parts, there is nothing to break.

Since the buttons are on a flat panel, the next step was to come up with a design for the panel itself. Initially, I was going to use a clear Lexan sheet with a printed panel over the switches with cutouts for the LEDs to shine through. However, I decided to 3D print the panel because it gave me control over the entire assembly and I didn’t have to worry about the panel wearing out. That just leaves the final two push buttons, and you may be wondering why I used physical push buttons for the Activate and Normalize functions. The reason for this is simple, these buttons are the ones that cause an action on the panel, and I didn’t want them to be accidentally activated by someone brushing their finger past them. These are stainless steel arcade-game quality push buttons with integrated LED illumination rings. I could have used them for all the buttons but that would have been prohibitively expensive and way too big for the entire panel. I think it was a good trade-off.

For Hoosac yard, I decided to package the panels into commercially available enclosures of heavy-gauge aluminum with dark walnut sides. These look nice and are very durable. The 3D panel is the top of a stack of electronics built as a unit that is mounted behind the panel on Lexan sheets. I used industrial-shielded RJ45 chassis jacks with plastic covers to protect them in storage. There’s no power plug – all the power comes in over the LCC connector.



Figure 1: Hoosac Yard Panels

For Upton yard, the 3D panel is built the same way as Hoosac, except there is no chassis.

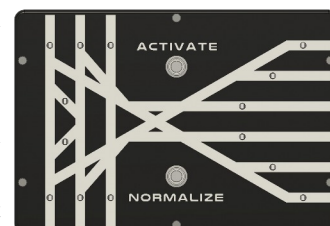


Figure 2: Upton Yard Panel

(Continued on Page 11)

Erich's Electronic Notebook

(Continued from Page 10)

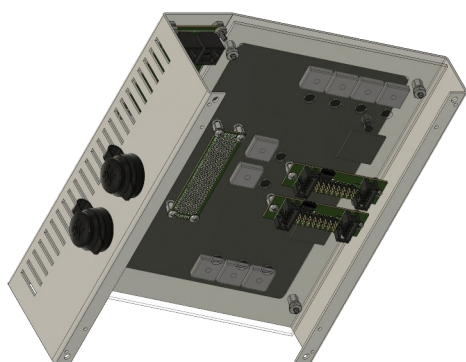


Figure 3: CAD Rendering of Hoosac Panel Construction.

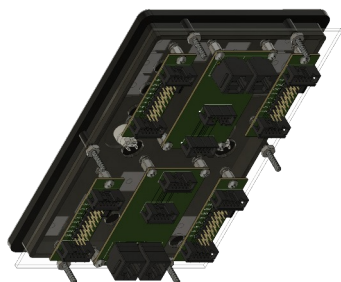


Figure 4: CAD Rendering of Upton Panel Construction.

All the electronics are mounted behind the panel on Lexan sheets as a unit.

Module Integration

Back in November, Jeff Gerow, Gerry Covino and I met at Dick Ball's house where he set us up in a tent outside his garage where we began the integration of the new panels into Upton and Hoosac yards. The logistics of the integration effort on this project have been one of the most challenging aspects of the work to-date. These modules are stored either in the HUB trailer or in the HUB storage unit in Ashland, Mass. To work on Hoosac, we need the two 6-foot modules, and to work on Upton, we need the two 4-foot East/West modules plus the 4-foot



Figure 5: Gerry and Jeff Working on Hoosac



Figure 6: Jeff Pondering Erich's Wiring Diagram



Figure 7: Gerry Focused on getting all those wires nice and neat!



Figure 8: Upton awaiting its fate...

yard entry module. That's 24 feet of modules in case you're counting. Fortunately, to power up and test LCC, we just need the 18VAC accessory supply since LCC is completely independent of DCC.

On this first installation day, we had to remove all of the Tortoise connectors and replace them with the RR-CirKits Tortoise Quik-Link boards that we use to control the Tortoises from the RR-CirKits Tower LCC boards. We then had to make up the 10-pin ribbon cables to connect all of the Tortoise Quik-Link boards, install the RR-CirKits Tower LCC boards in the yard modules that needed them, install the LCC power supply, add LCC RJ45 jacks and wiring to complete the LCC network and, finally, install the Upton panel. The following pictures are from that adventure.

Problems

One very serious issue that hit us when we got Hoosac to the first show (Wilmington) is that we realized that the RR-CirKits Quik-Link boards really didn't like being plugged into the 0.156" Molex pins that are on the HUB's Tortoise switch machines. I mentioned this in the last issue. We suffered through this again at the HUB show, but we were able to get this fixed for Springfield. Figure 9 is a photo of the new HUB Tortoise Adapter installed. This adapter allows the RR-CirKits Quik-Link to be mounted up against the Tortoise with double-stick tape and I added a DPDT switch so that the polarity of the Tortoise could easily be reversed so that you don't have to flip the board over. The final modification I need to make is to 3D-print a small lock-out cover for the switch so that once the final position of the switch is correctly selected, we can lock it in place so that the switch isn't inadvertently flipped causing strange behavior in the future. I'm pretty convinced that I can 3D-print that myself out of almost anything.

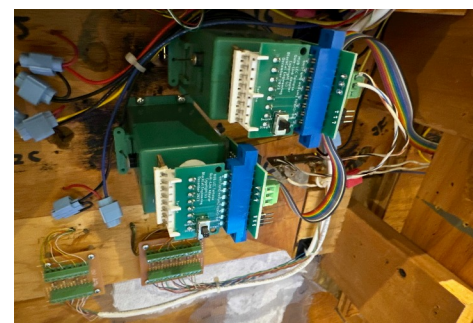


Figure 9: HUB Tortoise Adapter Installed.

Upton

Prior to Springfield, we needed to get Upton yard running. At the end of the Wenham show Dick drove the three pieces of Upton Yard to my house. Then the following week Jeff Gerow made the trek up to New Hampshire for a marathon debugging session. We set up Upton in our living room, much to the delight of my incredibly supportive spouse, Holly – you all owe her a huge thank you, by the way. Laptops-a-blazing, we completed the bring-up of Upton yard in about four hours. Working in the living room is a whole lot more fun than working outside in the winter! Here are some photos of that experience.

(Continued on Page 12)

Erich's Electronic Notebook

(Continued from Page 11)

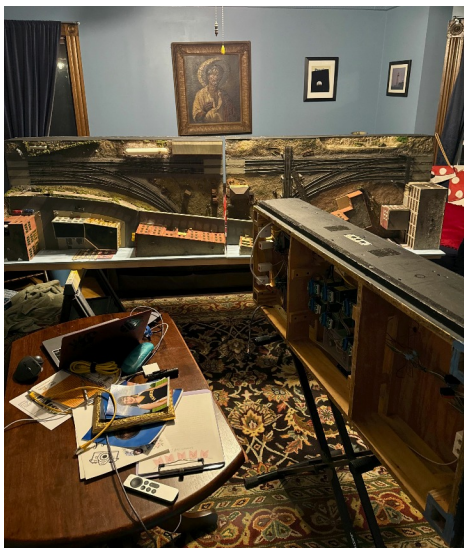


Figure 10: Hoosac Yard taking over our living room.

Next Steps

This has been an unusually intense, year-long project for a small group of volunteers. I haven't tried to keep track, but I would guess that hundreds of hours of work has gone into this effort to-date, and as I think I have made clear, it's not quite done. In addition to adding the switch



Figure 11: Jeff testing routes.

locks mentioned above, we still have more work to do on the Hoosac logic, we must fix Upton's relays and then re-verify that everything is working since we must touch 30-year-old wiring (frightening). It's my intention to have all of that fleshed out by the end of this show season and then I can turn my attention back to the signaling project that I was going to do last year. The good news for that project is that I was able to spend some time with Dick Bronson during the Springfield show. He was right next to Ken Cameron (of JMRI fame) in the Stroh building, so we had a very productive discussion about the issues that had been bouncing around in my head about the signaling project. I'm chomping at the bit to prototype these ideas on the HUB Signaling Testbed and start really making progress to flesh these



Figure 12: Jeff updating the logic with JMRI.

out. I can hopefully attract some of you to help out so that the signaling project is not another marathon like the yard panels. Maybe we could get back to our HUB tradition of having work sessions together and teaching our newer members how to do things that will help them with their own layouts in addition to helping out the module group. I have seen signs that there is interest, so it is my intention to build on this going forward. To be honest, if I'm unable to build that interest, I'm probably going to hit the pause button on it until such time that the help is there. I can't keep up this pace.

As always, if you have any questions, comments, or suggestions about this column, please reach out.

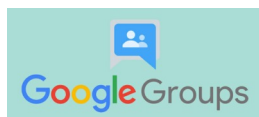
HUB Communications

The HUB Division has two ways it communicates directly with its members: via the hubdiv@googlegroups.com email list and the online Constant Contact system.

The Google Groups email list can be used by anyone already on the list to email everyone else on the list about division, model or prototype-related topics. For example, you can ask for modeling tips or advice from fellow members, or see if someone has a copy of that MR you've been trying to track down. It's definitely an underutilized member benefit.

The Constant Contact system is just for notifications from the Division to the members.

To get on the hubdiv@googlegroups.com email list, please email Peter Watson at: OfficeManager@hubdiv.org to request he include your email address on the list. Peter will also make sure that you are added to our Constant Contact list. You should also provide your email address to the NMRA and NER so that you receive communications from the national and regional levels.



RAILFUN:

(Continued from Page 1)

Build a Low-Cost Static Grass Applicator

By Manny Escobar and other HUB members

10 AM TO 12 PM Saturday, May 11, 2024

Chelmsford Public Library, 25 Boston Road, Chelmsford, MA

Manny will once again attempt to present his clinic on making a static grass applicator. The November attempt got short-circuited (pun intended) when the Library decided at the last minute to be closed on Veteran's Day. So this will be a continuation of that program.

For those who were at the Library in November, bring your kits with you. If you missed that one, we still have kits available, just contact Manny at president@hubdiv.org to reserve your kit. The cost is \$5.00.

In this clinic you will learn how to convert an inexpensive electronic fly swatter into a device to apply static grass. There are a number of static grass applicators on the market but they are relatively expensive. Using static grass yields some very effective and realistic looking grass for your scenery. Using this low cost applicator will give you the chance to try it without the cost of a more expensive unit.



March 18-21 from
6:30-10:30 PM
Eastern Daylight
Savings Time all
four evenings.

Visit the www.NERx.org website for complete details.

Example Clinics:

- “Design and Construction of Prototype Buildings for Model Railroaders” by Bill Barry
- “Custom Painting Scale Models” by Christopher Carfaro
- “Building the Cranberry Yard Freight House Craftsman Kit” by John Feraca, MMR
- “A Railroad Signaling Primer for Modelers Part 3: Route-Based Signaling and Interlockings – You Can Get There From Here” By Scott Gothe
- “Up On The Roof” by Tom Oxnard, MMR
- “Sprucing Up a Train Show Box Car” by James Whatley, MMR

Example Roundtable Discussions:

- “Layouts in Small Spaces” Led by Heath Hurwitz
- “Women in Model Railroading” Led by Angela Sutton
- “Work Crews on Your Home Layout” Led by Drew James
- “Lakeshores ‘24” Led by the NER 2024 convention team

Example Layout Tours:

- “New York Central - Buffalo & Rochester” by Jim DeMarco, MMR
- “Seneca Valley Lines” by the Rochester Model Railroad Club

Model Showcase:

The work of our members will be shown in between the clinics and layout tours and on the NERx website. You have until March 6 to submit your entries. Email showcase@nerx.org your name, description, scale, and one to three photos.

Tips ‘n Tricks:

New 5-15-minute short presentations that provide a tip. To share yours, email tips@nerx.org.

Build-It:

Build-It is similar to a Make-and-Take clinic. Participants will begin constructing a 36’ wood boxcar during NERx by completing the core box at home from a package of materials you can order. During the NER Convention in Rochester, participants will complete their car except for painting and decaling. Build-It is intended for those new to scratch-building, but experienced builders may learn some new techniques too! When completed, the model will qualify as scratchbuilt.

You can order a packet of materials before NERx or after watching the introductory construction videos during NERx. Contact superintendent@lakeshoresnmra.org for information.

Treasurer's Report

By Gerry Covino

Stated below is our financial position as of December 31, 2023, the midpoint in our fiscal year July 1, 2023 through June 30, 2024. The HUB Division’s fiscal outlook continues to look positive as shown on the Report below.

Financially, two positive programs resulted in an increase to our revenue base. The first is the “All Aboard Trains” exhibit at Boston’s Museum of Science (MOS). We have completed year three of the current five-year contract between the HUB and the MOS. Thanks to the continued support of our dedicated volunteers, the HUB again has met its contractual obligation to the MOS with the MOS receiving extremely positive feedback as to the exhibit’s quality. A sincere thank you goes to Boris Maznek, Dana Andrus and Shack Haralambou for their efforts and those of the many volunteers who provided countless hours of support in making this Exhibit such a success. The second program, which contributes to the financial success of the Division, is the donations program. Dan Fretz has provided numerous hours collecting materials, which are available to modelers at a substantial savings. Dan’s efforts in

conjunction with the many volunteers working at NEMTE continue to make this a successful program.

The NEMTE had a solid rebound following reductions due to the COVID pandemic. The number of dealer tables was stable from the previous year, with several new dealers in attendance. The overall attendance also remained stable this year. The many volunteer hours continue to help with the success of the show and the Board of Directors thanks everyone for his or her efforts. I also extend my personal thanks to Erich Whitney and John Russo who helped me by filling the void left by the premature death of the Show’s Business Manager, Mark Harlow. The Division does need to find a new Show Business Manager for next year. If you have an interest in serving in this position, please contact me for further details.

Our RAILFUN program is using a different monthly format than previous years. This program is available to all members and any person interested in kicking the tires as to what the NMRA can offer them in their modeling endeavors. Please see the *Headlight* for more program details. The Module group, under the direction of the Module Group Superintendent Bob Collins, had displays at Boxborough in

October, Greenberg Train Show in November and our NEMTE show in December, the Wenham Museum display and the Amherst Railway Show, both in January. Please follow the group’s plans in the *Headlight* for the remaining shows scheduled for this season.

We are extremely fortunate to have so many dedicated Volunteers who tirelessly contribute their time and talent to ensure the success of our organization and the programs we offer.

Please continue your generous support of time in making the Division so successful. Without you the volunteers, the Division could not exist. Please remember the Division is a 501(c)(3) charitable organization and as such any cash donations made to the Division might be tax deductible on your Federal Tax Return..

Mid-Year Account Balances

Checkbook	\$ 3,595.10
General Savings Account	0.00
Reserve-Life & Restricted	
Savings Accounts	14,161.26
Business Certificate of Deposit	66,279.61
Program Checking Account	1,020.70
PayPal Account	528.61
USPS Permit Account	<u>2.26</u>
Total Funds Available	\$ 85,587.54

HUB Headlight

Volume 40, Number 4, March - April, 2024

HUB Headlight, published by The HUB Division Inc., Northeastern Region, National Model Railroad Association, is issued in January, March, May, September and November. Contributions may be sent by email to the Editor or by mail to the Office Manager.

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Membership: National Model Railroad Association members residing within the boundaries of The HUB Division: zip codes 01400 through 02699. (Barnstable, Dukes, Essex, Franklin, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, and Worcester counties of Massachusetts.)

Headlight Printers

Versatile Printing Services, LLC, Burlington, MA

From the Modular Superintendent's Desk

By Bob Collins



I was asked recently why our modules are painted black. The lighting in many locations can be relatively dark. One of the disappointments we had when constructing our newest corner module, "Solar Winds," two years ago was that most of the fluorescent lighting in the halls we set up in was so dark that our solar panels wouldn't operate. So why not paint the modules white? The answer... dirt. Unfortunately, our modules look fun to touch by lots and lots of spectators. Though we do our best to discourage the "hands-on" approach of model railfanning by our guests, we can only do so much. Just this year, in Hopedale, one of our enthusiastic teen fans broke the crossing gates and a building on Newton Junction. So until we can invent paint that doesn't show grime, black it is.

Looking back, November through the end of January is a very busy time for model railroaders. Starting with the Greenberg show in mid-November we raced on to the New England Model Railroad Expo (the HUB Division's show) in Marlborough, make a quick three-day stop in Wenham, and finish out the winter season just a little over two months later at the massive Amherst Railway Society's show at the Big E. in Springfield. It can wear on the volunteers to have to set up and break down at a model railroad show every couple of weeks. The amazing part is that there is just as much enthusiasm from the members for the first show as the last.

I also want to highlight one of our upcoming Spring shows. This will be the second year that we are going to Holliston, MA. This will take place on Friday and Saturday, April 19th and 20th. For those members who live closer to the south shore as I do, driving up to northern Massachusetts for the Boxboro, Wenham, or Wilmington shows, or west to Springfield can be a bit of a hike. This is a much easier drive. Keep an eye on your email for further details.

Well, that's all for now, Ok to go HUB Division, next stop Wilmington.

RAILFUN Updates or Cancellations

RAILFUN Updates or cancellations will be posted on the division website (www.hubdiv.org) and issued via the HUB email list and via Constant Contact.

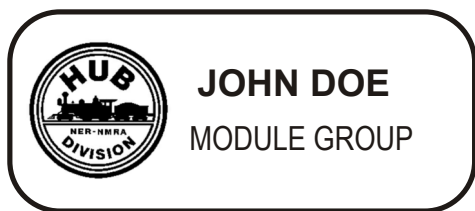
Submissions Requested

The *Headlight* is always accepting photos and articles relating to model and prototype railroading. Articles about model building or home layouts would be much appreciated. Earn credit towards your Author AP certificate. Please email editor@hubdiv.org.

Make checks payable to:
“The HUB Division, Inc.”

**Mail to: Gerald Covino, Treasurer
The HUB Division, Inc.
P.O. Box 672
Hollis, NH 03049-0672**

To pay using your credit card, email Treasurer@hubdiv.org and an electronic invoice will be sent to you.



Badge with magnetic holders and first line of printing is \$16.75, plus \$3.00 S&H. Each additional line is another \$2.00. You may have up to three lines on your name tag.

Cost: \$21.50 (1 line) \$23.50 (2 lines) \$25.50 (3 lines)

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I enclose \$8.00 for a subscription to the HUB Headlight for 2022

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It Takes All of Us Working Together!

() \$25.00 () \$50.00 () \$100.00 () Other \$

___ **YES**, I am happy to support The **HUB Division, Inc.** to foster railroading through displays, modeling and educational opportunities to members and the public at large. I show support with the enclosed gift.

Name _____

Address

City **State** **Zip**

The HUB Division offers to its members a complete packaged module kit for \$232.50 discounted to \$225.00 for payment by cash or check. The kit has everything you need, including all pre-cut lumber, hardware, a complete wiring harness for the DCC and inter-module connections, a panel-jack and wire, and even the roadbed and track! A module is the perfect solution if you do not have the space for a full-size layout or just want to experiment or learn new techniques without committing the time and money to a larger setup. Please contact Bob Collins at modulekits@hubdiv.org with additional questions and to order the module kits.

To order HUB Logo-branded merchandise, the HUB Division is partnering with Queensboro to bring you a personalized shopping experience. Within the HUB store you will find shirts, hats, outerwear and accessories in an array of sizes (men's, women's and youth) that you can purchase directly online and have sent directly to you.



In order to access the merchandise for ordering, please visit the website at:

<https://nmrahubdivision.qbstores.com>

Create a login with your personal details
and start shopping.

Each week, Queensboro will send a promotional email to all registered HUB Online store users with special pricing on selected sale items. Sale periods normally run for about three days.

Shipping rates to the contiguous US are always a flat \$7.95

Please email the PRDirector@hubdiv.org email address with any questions or concerns and someone will get back to you.

HUB Division Calendar of Events

(Subject to Change)

2024

Mar 16 (Sat)	HUB RAILFUN Meeting, 10 AM, Saint Ann's Parish Hall, West Bridgewater, MA
Mar 18-21 (Mon-Thu)	NERx virtual convention of the Northeastern Region, NMRA, www.nerx.org
Mar 23-24 (Sat-Sun)	HUB Modular Railroad display at the Greenberg's Toy & Train Show, Shriner's Auditorium, Wilmington, MA
Apr 1 (Mon)	Submissions deadline for the HUB Headlight May-Jun issue
Apr 19 (Fri)	The HUB Division Annual Meeting, 8 PM on Zoom
Apr 19 (Fri)	HUB RAILFUN Meeting, after the Annual Meeting on Zoom
May 4-5 (Sat-Sun)	HUB High Green - Operating Sessions at various layouts
May 11 (Sat)	HUB RAILFUN Meeting, 10 AM, Chelmsford Public Library, Chelmsford, MA
Jun 15 (Sat)	HUB RAILFUN Meeting
Jul 14 (Sun)	HUB Summer Picnic, Waushakum Live Steamers, Holliston, MA
Jul 15 (Mon)	Submissions deadline for the HUB <i>Headlight</i> Sep-Oct issue
Aug 4-11 (Sun-Sun)	2024 NMRA National Convention, 2024 SurfLiner, Long Beach, CA, www.2023texasexpress.com

RAILFUN.....

*NO MOTIONS.....**NO SECONDS.....**NO BUSINESS.....**NO YAWNS.....*

HUB Division Headlight
65 Branch Road
East Bridgewater, MA 02333-1601